

PWA

PWA Fundamentals

websites with superpowers



Fàilte agus madainn mhath!



Rowdy Rabouw

Born and raised in Gouda, The Netherlands

Front-End Focused Senior DevOps Engineer

@rowdyrabouw

♥ superhero movies, Formula One, mountain bike

PWA

Progressive

Web

App

Reliable

Always load and never show the downasaur

Fast

Respond quickly to user interactions

Engaging

Feel like a native app on the device

Key Features

- **Linkable** (*URL's*)
- **Safe** (*https*)
- **Discoverable** (*search engines*)
- **Responsive** (*works on every screen resolution*)
- **Feel like a native app** (*fast loading, look-and-feel*)
- **Always up-to-date** (*fresh from the web; no updates from app store*)
- **Installable** (*home screen, cache data*)
- **Connectivity-independent** (*can work offline*)
- **Re-engageable** (*home screen, push notifications*)

Key Features

- Linkable (*URL's*)
- Safe (*https*)
- Discoverable (*search engines*)
- Responsive (*works on every screen resolution*)
- **Feel like a native app (*fast loading, look-and-feel*)**
- Always up-to-date (*fresh from the web; no updates from app store*)
- **Installable (*home screen, cache data*)**
- **Connectivity-independent (*can work offline*)**
- Re-engageable (*home screen, push notifications*)



BUY TICKET

3 days 13 hours 09 minutes 45 seconds

SCOTLANDPHP CONFERENCE 2021

22nd & 23rd October 2021 - Edinburgh, UK

GET YOUR TICKET NOW!

COVID UPDATES





Starter Code

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```

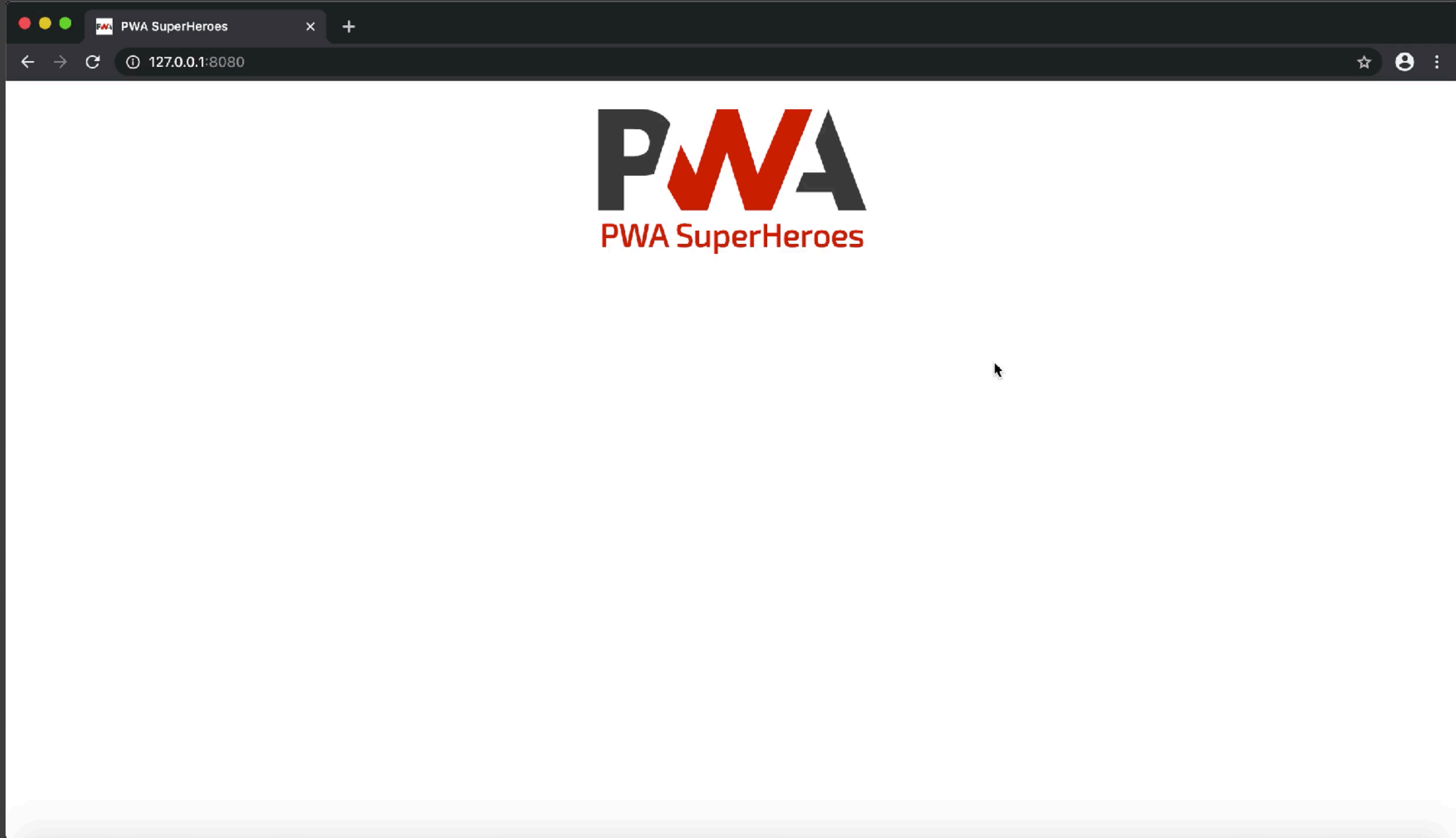


```
@font-face {
  font-family: "Exo 2";
  font-display: swap;
  font-style: normal;
  font-weight: 400;
  src: url("../fonts/exo2.woff2") format("woff2");
}

body {
  padding: 20px;
}

header img {
  max-height: 100px;
}

h1 {
  color: #df2305;
  font-family: "Exo 2", sans-serif;
  margin: 0;
  text-align: center;
}
```





Manifest File

Manifest File

- simple JSON file
- informs the browser about your web application
- tells it how it should behave when “installed”



```
{  
  "name": "PWA Superheroes",  
  "short_name": "PWAS",  
  "lang": "en-GB",  
  "start_url": "/",  
  "scope": ".",  
  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#3D3D3D",  
  "theme_color": "#DF2305",  
  "icons": []  
}
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
    <link rel="manifest" href="manifest.json" />
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```



master 6 branches 52 tags

Go to file Add file Code

	dependabot and dependabot-merge-action build(deps-dev): bump eslin...	7333834 12 hours ago	798 commits
📁 .github	ci(release): update node version		11 days ago
📁 bin	fix(puppets): updated scraper for latest specs and improve fallback h...		15 months ago
📁 src	feat(file): add maskable keyword to the manifest icons' file name		11 days ago
📁 static	feat(main): add BLM branding #blacklifematters		17 months ago
📄 .editorconfig	chore(format): extend formatting rules		10 months ago
📄 .eslintrc	chore(deps): update dependencies		11 days ago
📄 .gitattributes	chore(format): extend formatting rules		10 months ago
📄 .gitignore	feat(main): enable parallel execution		14 months ago
📄 .npmignore	build(npm): optimized npm package		17 months ago
📄 .prettierrc	chore(format): extend formatting rules		10 months ago
📄 .releaserc	ci(semantic): fix typo in semantic-release config		3 months ago

About

Automates PWA asset generation and image declaration. Automatically generates icon and splash screen images, favicons and mstile images. Updates manifest.json and index.html files with the generated images according to Web App Manifest specs and Apple Human Interface guidelines.

- android
- manifest
- ios
- pwa
- progressive-web-app
- favicon
- icon
- image-generation
- html-tags
- splash-screen
- progressive-web-apps
- favicon-generator
- puppeteer
- splash-screens
- launch-image
- icon-sizes
- manifest-specs
- pwa-assets
- mstile

```
{
  "name": "PWA Superheroes",
  "short_name": "PWAS",
  "lang": "en-GB",
  "start_url": "/",
  "scope": ".",
  "display": "standalone",
  "orientation": "portrait",
  "background_color": "#3D3D3D",
  "theme_color": "#DF2305",
  "icons": [
    {
      "src": "manifest-icon-192.png",
      "sizes": "192x192",
      "type": "image/png"
    },
    {
      "src": "manifest-icon-512.png",
      "sizes": "512x512",
      "type": "image/png"
    }
  ]
}
```

Browser window showing the Application tab for a PWA named "PWA SuperHeroes". The page displays the PWA logo and the Application Manifest details.

Application Manifest
[:8080/manifest.json](#)

Installability
⚠ No matching service worker detected. You may need to reload the page, or check that the service worker is registered.

Identity

Name	PWA Superheroes
Short name	PWAS

Presentation

Start URL	/
Theme color	■ #DF2305
Background color	■ #3D3D3D
Orientation	portrait
Display	standalone

Icons

192x192
image/png

Application Panel:

- Manifest
- Service Workers
- Clear storage

Storage Panel:

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache Panel:

- Cache Storage
- Application Cache

Background Services Panel:

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames Panel:

- top



Service Workers

Service Workers

- JavaScript file
- runs in the background in a separate thread; non-blocking
- scoped to a website
- can't modify page; no access to DOM
- asynchronous; promises or async/await
- event driven

Man-in-the-middle



Marvel-in-the-middle




```
// sw.js

self.addEventListener("install", event => {
  console.log("[Service Worker] Installing Service Worker ...", event);
});

self.addEventListener("activate", event => {
  console.log("[Service Worker] Activating Service Worker ...", event);
  // ensure that the Service Worker is activated correctly (fail-safe)
  return self.clients.claim();
});
```

```
// app.js

// check for modern browser
if ("serviceWorker" in navigator) {
  navigator.serviceWorker
    .register("/sw.js")
    .then(() => {
      console.log("Service Worker registered!");
    })
    .catch(err => {
      console.log(err);
    });
}
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
    <title>PWA SuperHeroes</title>
    <link rel="icon" type="image/png" href="favicon.png" />
    <link rel="stylesheet" href="css/app.css" />
    <link rel="manifest" href="manifest.json" />
    <script src="js/app.js"></script>
  </head>
  <body>
    <header>
      
      <h1>PWA SuperHeroes</h1>
    </header>
  </body>
</html>
```

Browser window showing the Application tab for a PWA. The page title is "PWA SuperHeroes" and the URL is "127.0.0.1:8080". The browser interface includes navigation buttons, a search bar, and a menu with options like Elements, Console, Sources, Network, Performance, Memory, Application, and Security. The Application tab is active, displaying the App Manifest, Installability, Identity, Presentation, and Icons sections. The main content area shows the PWA logo and the text "PWA SuperHeroes".



- Application
 - Manifest
 - Service Workers
 - Clear storage
- Storage
 - Local Storage
 - Session Storage
 - IndexedDB
 - Web SQL
 - Cookies
- Cache
 - Cache Storage
 - Application Cache
- Background Services
 - Background Fetch
 - Background Sync
 - Notifications
 - Payment Handler
 - Push Messaging
- Frames
 - top

App Manifest

[manifest.json](#)

Installability

⚠ No matching service worker detected. You may need to reload the page, or check that the service worker is registered.

Identity

Name PWA Superheroes

Short name PWAS

Presentation

Start URL /

Theme color ■ #DF2305

Background color ■ #3D3D3D

Orientation portrait

Display standalone

Icons

192x192

image/png



Cache API

Browser window: PWA SuperHeroes, 127.0.0.1:8080

Device: iPhone 6/7... 414 x 736 87%

Network tab: Recording network activity... Perform a request or hit ⌘ R to record the reload. [Learn more](#)

Filter	Hide data URLs	All	XHR	JS	CSS	Img	Media	Font	Doc	WS	Manifest	Other
10 ms	20 ms	30 ms	40 ms	50 ms	60 ms	70 ms	80 ms	90 ms	100 ms	110 ms		




```
// sw.js

self.addEventListener("install", event => {
  // without waiting the SW will continue without caching
  event.waitUntil(
    // opens the existing `static` cache or creates it
    caches.open("static").then(cache => {
      console.log("[Service Worker] Precaching Files");
      cache.add("/");
      cache.add("index.html");
      cache.add("css/app.css");
      cache.add("fonts/exo2.woff2");
      cache.add("js/app.js");
      cache.add("img/pwa.svg");
      cache.add("favicon.png");
      cache.add("manifest.json");
      cache.add("manifest-icon-192.png");
    })
  );
});
```

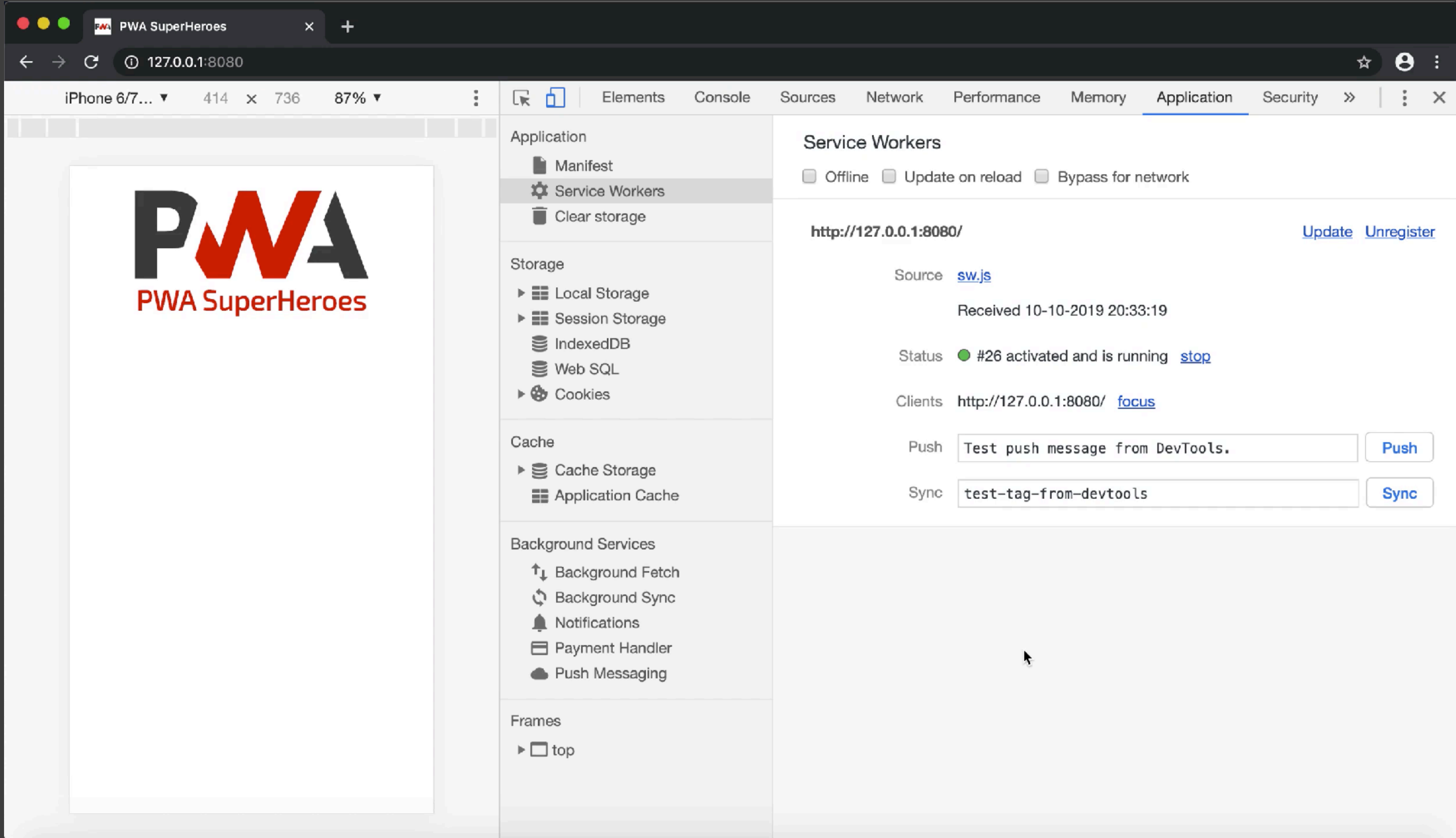


```
// sw.js
```

```
const STATIC_CACHE = "static-v1";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js",  
  "img/pwa.svg", "favicon.png",  
  "manifest.json", "manifest-icon-192.png"];
```

```
self.addEventListener("install", event => {  
  event.waitUntil(  
    caches.open(STATIC_CACHE).then(cache => {  
      cache.addAll(STATIC_FILES);  
    })  
  );  
});
```

Browser window showing the PWA SuperHeroes application running on a simulated iPhone 6/7 device. The address bar displays `127.0.0.1:8080`. The Application panel is open, showing the Service Workers section. A service worker is registered for `http://127.0.0.1:8080/` with source `sw.js`, received on 10-10-2019 20:33:19, and is currently activated and running (#26). The status is `#26 activated and is running`. The clients list shows `http://127.0.0.1:8080/` with a `focus` event. The panel includes controls for `Push` (Test push message from DevTools.) and `Sync` (test-tag-from-devtools).



Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
- Application Cache

Background Services

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames

- top

Service Workers

Offline Update on reload Bypass for network

`http://127.0.0.1:8080/`

[Update](#) [Unregister](#)

Source [sw.js](#)

Received 10-10-2019 20:33:19

Status ● #26 activated and is running [stop](#)

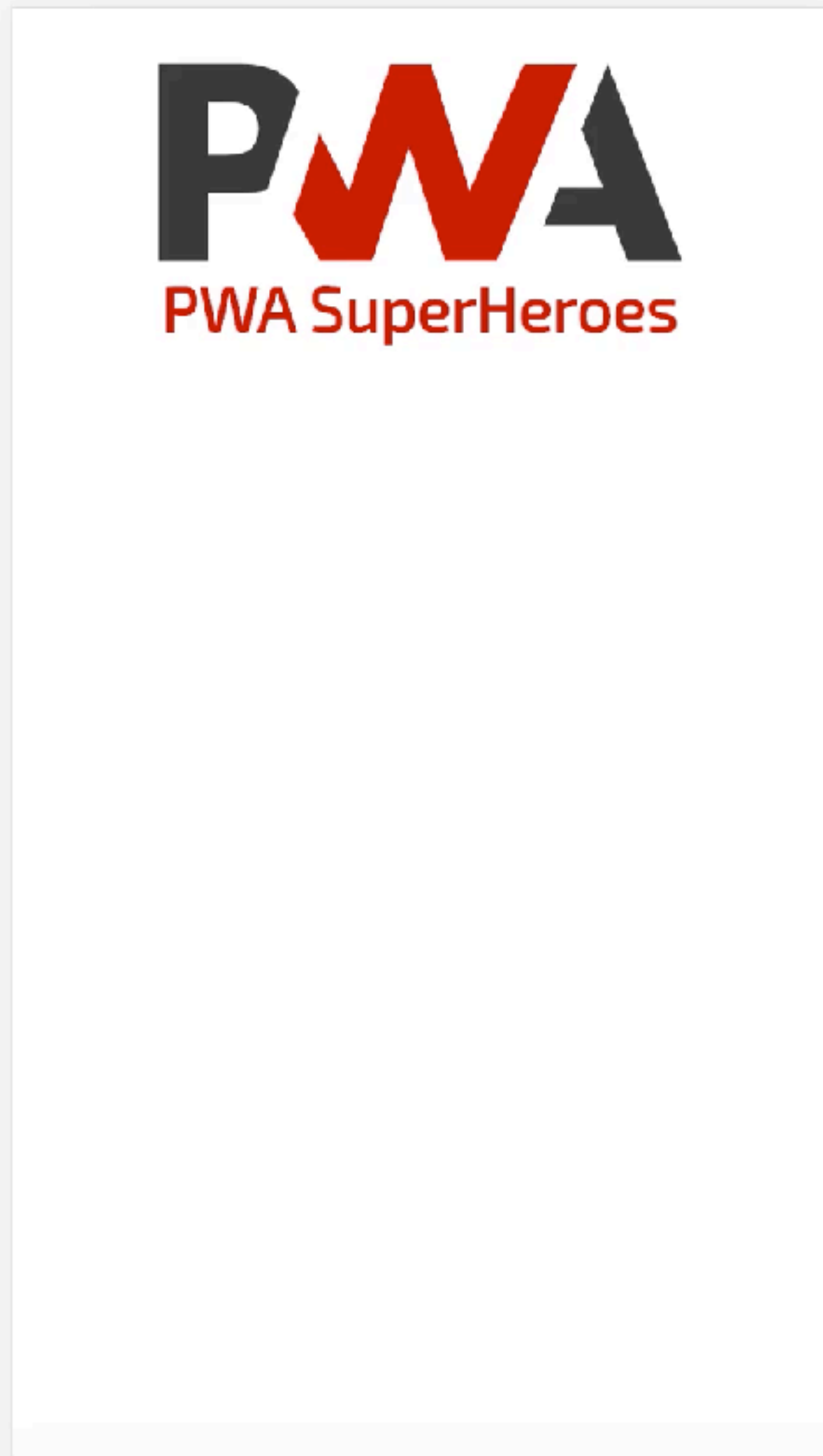
Clients `http://127.0.0.1:8080/` [focus](#)

Push

[Push](#)

Sync

[Sync](#)



Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
 - static-v1 - http://127.0.0.1:8080
- Application Cache

Background Services

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames

- top

Service Workers

Offline Update on reload Bypass for network

http://127.0.0.1:8080/ [Update](#) [Unregister](#)

Source [sw.js](#)

Received 10-10-2019 20:33:19

Status ● #26 activated and is running [stop](#)

● #27 waiting to activate [skipWaiting](#)

Received 10-10-2019 20:34:50

Clients [http://127.0.0.1:8080/](#) [focus](#)

Push

Sync





Fetch API

Chromium browser window showing a PWA SuperHeroes application at 127.0.0.1:8080. The page displays the PWA SuperHeroes logo. The Network tab is active, showing a message: "Recording network activity... Perform a request or hit ⌘ R to record the reload. [Learn more](#)".



Recording network activity...
Perform a request or hit ⌘ R to record the reload.

[Learn more](#)


```
// sw.js

self.addEventListener("fetch", event => {
  event.respondWith(
    // look at all caches for a match on the key (= request)
    caches
      .match(event.request)
      // you will always get a response; null if not found
      .then(response => {
        if (response) {
          // if found: return from cache
          return response;
        } else {
          // fetch it from the server
          return fetch(event.request);
        }
      })
  );
});
```


Browser window showing the PWA SuperHeroes application running on a simulated iPhone 6/7 device. The address bar shows the URL 127.0.0.1:8080. The Application panel is open, displaying the Service Workers section. The Service Workers list shows a worker for http://127.0.0.1:8080/ with source sw.js, received on 10-10-2019 20:34:50, and status #27 activated and is running. The worker is currently active, and the interface provides controls to push a message or sync data.



Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
- Application Cache

Background Services

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames

- top

Service Workers

- Offline Update on reload Bypass for network

http://127.0.0.1:8080/

[Update](#) [Unregister](#)

Source [sw.js](#)

Received 10-10-2019 20:34:50

Status ● #27 activated and is running [stop](#)

Clients [http://127.0.0.1:8080/](#) [focus](#)

Push

[Push](#)


Sync

[Sync](#)



SPEED !!!

Browser window showing PWA SuperHeroes at 127.0.0.1:8080. The page displays the PWA SuperHeroes logo. The Network tab is open, showing a list of requests and a waterfall chart. A red arrow points to the 'Load: 145 ms' metric in the bottom status bar.




Name	Status	Type	Initiator	Size	Time	Waterfall
127.0.0.1	200	document	Other	870 B	30 ms	
app.css	200	stylesheet	(index)	650 B	62 ms	
app.js	200	script	(index)	525 B	38 ms	
pwa.svg	200	svg+xml	(index)	1.8 KB	38 ms	
manifest.json	200	manifest	Other	747 B	7 ms	
favicon.png	200	png	Other	20.7 KB	13 ms	
manifest-icon-192.png	200	png	Other	4.4 KB	9 ms	

7 requests | 29.6 KB transferred | 27.6 KB resources | Finish: 175 ms | **DOMContentLoaded: 140 ms** | **Load: 145 ms**

Browser window showing a PWA SuperHeroes application running on 127.0.0.1:8080. The page displays the PWA SuperHeroes logo. The Network tab is open, showing a list of requests and their performance metrics.

Name	Status	Type	Initiator	Size	Time	Waterfall
127.0.0.1	200	document	Other	(ServiceWorker)	22 ms	
app.css	200	stylesheet	(index)	(ServiceWorker)	25 ms	
app.js	200	script	(index)	(ServiceWorker)	25 ms	
pwa.svg	200	svg+xml	(index)	(ServiceWorker)	25 ms	
manifest.json	200	manifest	Other	(ServiceWorker)	8 ms	
favicon.png	200	png	Other	(ServiceWorker)	10 ms	
manifest-icon-192.png	200	png	Other	(ServiceWorker)	3 ms	

7 requests | 0 B transferred | 27.6 KB resources | Finish: 87 ms | DOMContentLoaded: 55 ms | Load: 59 ms





Cache Cleanup

...

```
<main>  
  <button id="btnInstall" class="hide">Add to Home screen</button>  
  <a href="about.html">about</a>  
</main>
```

...


```
// about.html

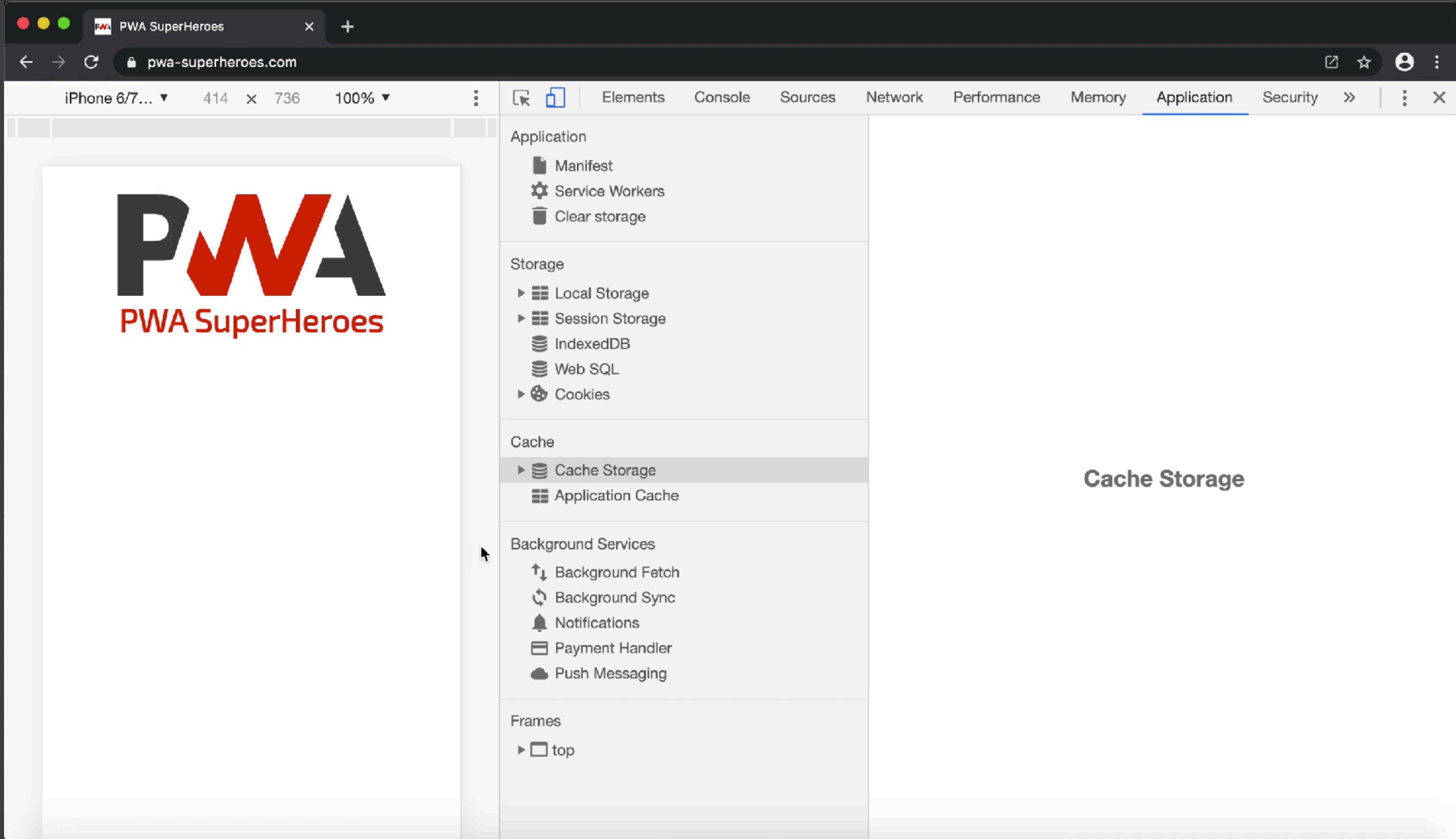
<!DOCTYPE html>
<html lang="en">
  <head>
    ...
  </head>
  <body>
    <header>
      ...
    </header>
    <main>
      <p>This is a demo website for a Progressive Web App
        talk by Rowdy Rabouw.</p>
      <a href="https://rowdy.codes" target="_blank">more info</a>
    </main>
  </body>
</html>
```

```
a, p {  
  color: #3d3d3d;  
  font-family: "Exo 2", sans-serif;  
  font-size: 20px;  
  text-decoration-color: #df2305;  
}
```

// sw.js

```
const STATIC_CACHE = "static-v2";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js",  
  "img/pwa.svg", "favicon.png",  
  "manifest.json", "manifest-icon-192.png"];
```

Browser window showing the PWA SuperHeroes application. The page displays the PWA logo and the text "PWA SuperHeroes". The browser's developer tools are open, showing the Application tab. The left sidebar of the developer tools is expanded to show the Cache section, with "Cache Storage" selected. The main content area of the developer tools displays "Cache Storage".



The browser window shows the URL `pwa-superheroes.com` and the page is rendered in a mobile view (iPhone 6/7...). The developer tools are open, and the Application tab is active. The left sidebar is expanded to show the Cache section, with "Cache Storage" selected. The main content area of the developer tools displays "Cache Storage".

Application

- Manifest
- Service Workers
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
- Application Cache

Background Services

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames

- top

Cache Storage

```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    // will return an array of cache names
    caches.keys().then(keys => {
      return Promise.all(
        // go over all available keys
        keys.map(key => {
          if (key !== STATIC_CACHE) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```



Dynamic Caching


```
// sw.js
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v3";  
const STATIC_FILES = ["/", "index.html", "css/app.css",  
"fonts/exo2.woff2", "js/app.js",  
"js/a2hs.js", "img/pwa.svg",  
"favicon.png", "manifest.json",  
"manifest-icon-192.png"];
```

```
// sw.js

self.addEventListener("fetch", event => {
  event.respondWith(
    caches.match(event.request).then(response => {
      if (response) { return response; }
      else {
        return fetch(event.request);
      }
    })
  );
});
```

```
// sw.js
```

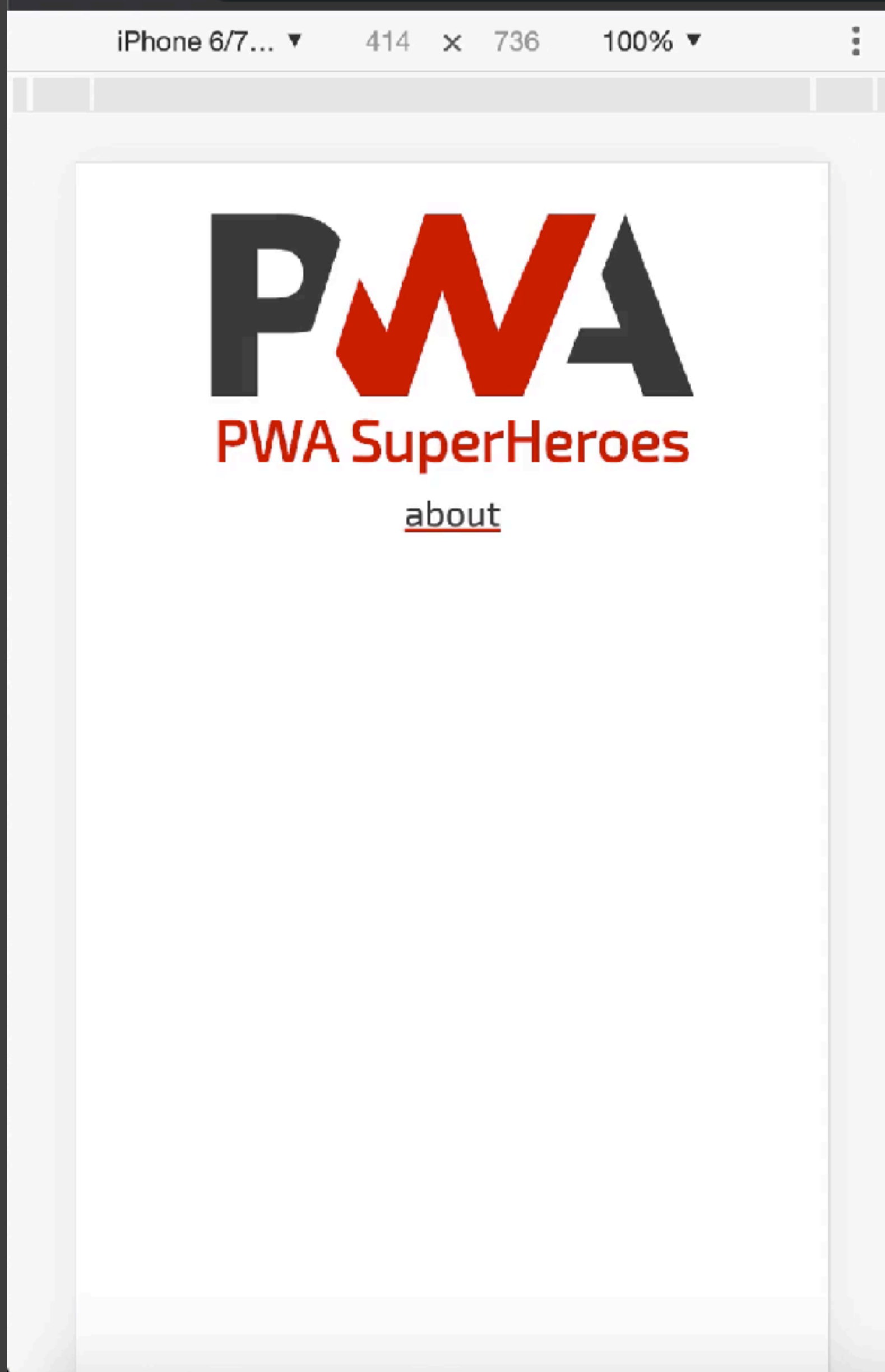
```
self.addEventListener("fetch", event => {  
  event.respondWith(  
    caches.match(event.request).then(response => {  
      if (response) { return response; }  
      else {  
        return (  
          fetch(event.request).then(res => {  
            return caches.open(DYNAMIC_CACHE).then(cache => {  
              cache.put(event.request.url, res.clone());  
              return res;  
            });  
          });  
        );  
      }  
    });  
  });  
});
```

```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    caches.keys().then(keys => {
      return Promise.all(
        keys.map(key => {
          if (key !== STATIC_CACHE) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```

```
// sw.js

self.addEventListener("activate", event => {
  event.waitUntil(
    caches.keys().then(keys => {
      return Promise.all(
        keys.map(key => {
          if (key !== STATIC_CACHE && key !== CACHE_DYNAMIC_NAME) {
            return caches.delete(key);
          }
        })
      );
    })
  );
  return self.clients.claim();
});
```



Elements Console Sources Network Performance Memory Application Security

Filter Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

Name	Status	Type	Initiator	Size	Time	Waterfall
pwa-superheroes.com	200	document	Other	(ServiceWorker)	9 ms	
app.css	200	stylesheet	(index)	(ServiceWorker)	26 ms	
app.js	200	script	(index)	(ServiceWorker)	25 ms	
a2hs.js	200	script	(index)	(ServiceWorker)	68 ms	
pwa.svg	200	svg+xml	(index)	(ServiceWorker)	25 ms	
a2hs.js	200	fetch	sw.js:30	516 B	33 ms	
manifest.json	200	manifest	Other	(ServiceWorker)	5 ms	
favicon.png	200	png	Other	(ServiceWorker)	5 ms	
manifest-icon-192.png	200	png	Other	(ServiceWorker)	7 ms	

9 requests | 516 B transferred | 29.0 KB resources | Finish: 115 ms | DOMContentLoaded: 94 ms | Load: 93 ms



Offline Fallback

Browser window showing the PWA SuperHeroes website. The page displays the PWA logo and the text "PWA SuperHeroes" with an "about" link. The browser's developer tools are open, showing the Application tab. The Service Workers section is active, displaying a service worker for "https://pwa-superheroes.com/" with a status of "#60 activated and is running". The interface includes controls for "Offline", "Update on reload", and "Bypass for network". There are also input fields for "Push" (Test push message from DevTools.) and "Sync" (test-tag-from-devtools) with corresponding "Push" and "Sync" buttons. The left sidebar of the developer tools lists various application features like Manifest, Service Workers, Clear storage, Storage (Local Storage, Session Storage, IndexedDB, Web SQL, Cookies), Cache (Cache Storage, Application Cache), Background Services (Background Fetch, Background Sync, Notifications, Payment Handler, Push Messaging), and Frames (top).

PWA
PWA SuperHeroes
[about](#)

Service Workers

Offline Update on reload Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source [sw.js](#) ✖ 15

Received 4-11-2019 14:29:59

Status ● #60 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push [Push](#)

Sync [Sync](#)

▶ Service workers from other origins

```
// offline.html

<!DOCTYPE html>
<html lang="en">
  <head>
    ...
  </head>
  <body>
    <header>
      ...
    </header>
    <main>
      <p><b>We're sorry, this page hasn't been cached yet :-( </b></p>
      <p>But why don't you try one of our <a href="/">other pages</a>?</p>
    </main>
  </body>
</html>
```

```
// sw.js
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v4";  
const STATIC_FILES = ["/", "index.html", "offline.html",  
  "css/app.css", "fonts/exo2.woff2",  
  "js/app.js", "js/a2hs.js", "img/pwa.svg",  
  "favicon.png", "manifest.json",  
  "manifest-icon-192.png"];
```

```

// sw.js

self.addEventListener("fetch", event => {
  event.respondWith(
    caches.match(event.request).then(response => {
      if (response) { return response; }
      else {
        return (
          fetch(event.request).then(res => {
            return caches.open(DYNAMIC_CACHE).then(cache => {
              cache.put(event.request.url, res.clone());
              return res;
            });
          });
        );
      }
    });
  );
});

```

```
// sw.js

...
return fetch(event.request)
  .then(res => {
    ...
  })
  .catch(err => {
    return caches.open(STATIC_CACHE).then(cache => {
      return cache.match("/offline.html");
    });
  });
...

```



```
// sw.js

...
return fetch(event.request)
  .then(res => {
    ...
  })
  .catch(err => {
    return caches.open(STATIC_CACHE).then(cache => {
      if (event.request.headers.get("accept").includes("text/html")) {
        return cache.match("/offline.html");
      }
    });
  });
...

```

Browser window showing the PWA SuperHeroes website on an iPhone 6/7 simulator. The URL is pwa-superheroes.com. The page displays the PWA SuperHeroes logo and an [about](#) link.

The DevTools Application panel is open, showing the Service Workers section. The active service worker is for https://pwa-superheroes.com/.

Service Workers

Offline Update on reload Bypass for network

https://pwa-superheroes.com/ [Update](#) [Unregister](#)

Source [sw.js](#) 18

Received 4-11-2019 14:29:59

Status ● #60 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push [Push](#)

Sync [Sync](#)

▶ Service workers from other origins

Application Panel:

- Manifest
- Service Workers**
- Clear storage

Storage:

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache:

- Cache Storage
 - static-v3 - https://pwa-superheroes.com/
- Application Cache

Background Services:

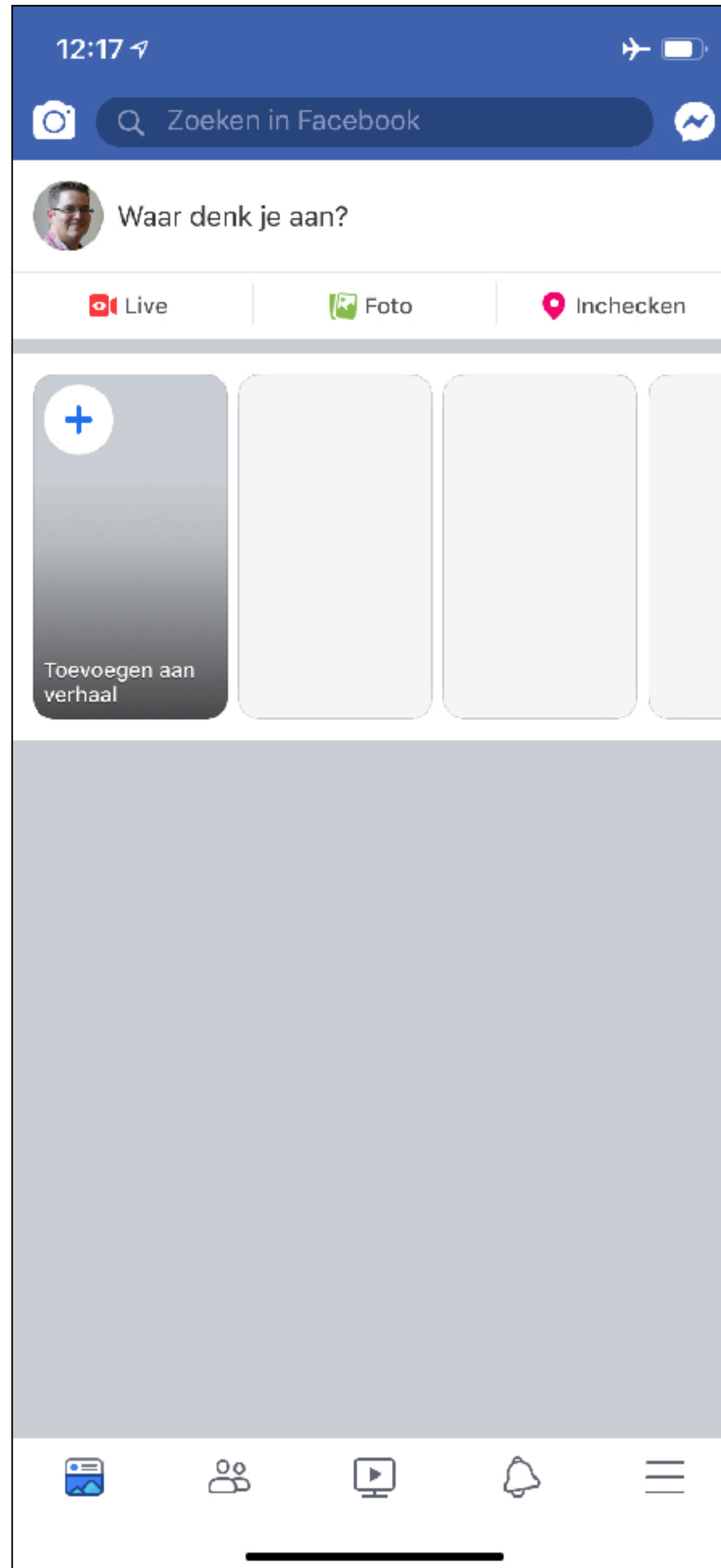
- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames:

- top



Application Shell



...

```
<main>
  <button id="btnInstall" class="hide">Add to Home screen</button>
  <a href="about.html">about</a>
  <div class="container">
    <div class="placeholder">
      <h2 id="name">&nbsp;</h2>
    </div>
    <div class="placeholder">
      <p id="details">&nbsp;<br />&nbsp;</p>
    </div>
    <div class="placeholder img-placeholder" id="image"></div>
  </div>
</main>
```

...

```
h2 {
  font-family: "Exo 2", sans-serif;
  margin-bottom: 0;
}

.container {
  width: 240px;
  margin: auto;
}

.placeholder {
  background-color: #f3f3f3;
  margin-bottom: 10px;
  animation: colorchange 2.5s cubic-bezier(0.36, 0.07, 0.19, 0.97) both;
  animation-iteration-count: infinite;
}
```



```
.img-placeholder {  
  height: 320px;  
}
```

```
img {  
  max-width: 100%;  
  border-top-left-radius: 70px;  
  border-bottom-right-radius: 70px;  
}
```

```
@keyframes colorchange {  
  0% { background: #f3f3f3; }  
  50% { background: #d1d1d1; }  
  100% { background: #f3f3f3; }  
}
```

```
// sw.js
```

```
const STATIC_CACHE = "static-v5";
```

Browser window showing the PWA SuperHeroes application. The page displays the PWA logo and the text "PWA SuperHeroes" with a link to "about". The browser's developer tools are open, showing the Application panel with the Service Workers section selected. The Service Workers panel shows a single worker for "https://pwa-superheroes.com/" with status "#64 activated and is running". The panel also includes controls for Offline, Update on reload, and Bypass for network, as well as buttons for Update, Unregister, Push, and Sync.

PWA
PWA SuperHeroes
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Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
- Session Storage
- IndexedDB
- Web SQL
- Cookies

Cache

- Cache Storage
- Application Cache

Background Services

- Background Fetch
- Background Sync
- Notifications
- Payment Handler
- Push Messaging

Frames

- top

Service Workers

Offline Update on reload Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source [sw.js](#)

Received 5-11-2019 19:33:56

Status ● #64 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push

[Push](#)

Sync

[Sync](#)

▶ Service workers from other origins





Dynamic Data

```
// api.js

const url = "https://www.superheroapi.com/api.php/3251184438288441/213";

fetch(url)
  .then(res => {
    return res.json();
  })
  .then(data => {
    console.log("Retrieved from web", data);
    updateUI("web", data);
  });
```

```
// api.js

function updateUI(updateBy, data) {
  console.log(`Update UI by ${updateBy}`);
  document.getElementById("name").innerHTML = data.name;
  const details = `${data.biography["full-name"]}, ${data.biography["place-
of-birth"]}<br/>${data.appearance.height[1]} / ${data.appearance.weight[1]}
`;
  document.getElementById("details").innerHTML = details;
  document.getElementById("image").innerHTML = `![${data.name}]($
{data.image.url})
```



```
<!DOCTYPE html>
<html lang="en">
  <head>
    ...
    <script defer src="js/api.js"></script>
  </head>
  <body>
    ...
  </body>
</html>
```

```
// sw.js
```

```
const STATIC_CACHE = "static-v6";  
const STATIC_FILES = ["/", "index.html", "offline.html", "css/app.css",  
  "fonts/exo2.woff2", "js/app.js", "js/a2hs.js",  
  "js/api.js", "img/pwa.svg", "favicon.png",  
  "manifest.json", "manifest-icon-192.png"];
```

Browser window showing the PWA SuperHeroes website on an iPhone 6/7 simulator. The page displays the PWA logo and the text "PWA SuperHeroes" with an "about" link. The DevTools Application panel is open, showing the Service Workers section. The active service worker is for the origin https://pwa-superheroes.com/ and is running. The panel includes controls for Offline mode, Update on reload, and Bypass for network. It also shows the source file sw.js, the received time (6-11-2019 07:30:17), and the status (#65 activated and is running). There are buttons for Update and Unregister. Below, there are input fields for testing push messages and sync tags, with corresponding Push and Sync buttons. The left sidebar of DevTools shows the Application tree with categories like Manifest, Service Workers, Clear storage, Storage (Local Storage, Session Storage, IndexedDB, Web SQL, Cookies), Cache (Cache Storage, Application Cache), Background Services (Background Fetch, Background Sync, Notifications, Payment Handler, Push Messaging), and Frames (top).

PWA

PWA SuperHeroes

[about](#)

Service Workers

Offline Update on reload Bypass for network

https://pwa-superheroes.com/

[Update](#) [Unregister](#)

Source [sw.js](#)

Received 6-11-2019 07:30:17

Status ● #65 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push

[Push](#)

Sync

[Sync](#)

▶ Service workers from other origins



IndexedDB

IndexedDB

An asynchronous transactional key-value database in the browser for data that changes frequently and is typically in JSON format.

Transactional means that if one of the actions within an operation fails, none of those actions are applied to keep database integrity.



jakearchibald / idb

Notifications

Star 3.8k

Fork 286

- Code
- Issues 6
- Pull requests
- Actions
- Projects
- Wiki
- Security
- Insights

main 2 branches 32 tags

Go to file Code

jakearchibald 6.1.2	303fa24 12 days ago	🕒 158 commits
.github/ISSUE_TEMPLATE	Update issue templates	8 months ago
build	Changing KnownKeys to be compatible with more TS versions. Fixes ...	12 days ago
lib	Updating dependencies and formatting	21 days ago
src	Changing KnownKeys to be compatible with more TS versions. Fixes ...	12 days ago
test	Updating dependencies and formatting	21 days ago
.gitignore	Better build system & updated dependencies	17 months ago
.prettierrc.json	Prettier	2 years ago
LICENSE	Update license to be inline with package.json	5 years ago
README.md	Updating documentation for methods that are now supported by Edg...	15 days ago
changes.md	Rebuild	5 months ago
generic-tsconfig.json	Better errors from shortcut methods (#181)	13 months ago
package-lock.json	6.1.2	12 days ago
package.json	6.1.2	12 days ago
rollup.config.js	Keep iife small	5 months ago
tsconfig.json	Better errors from shortcut methods (#181)	13 months ago

About

IndexedDB, but with promises

www.npmjs.com/package/idb

Readme

ISC License

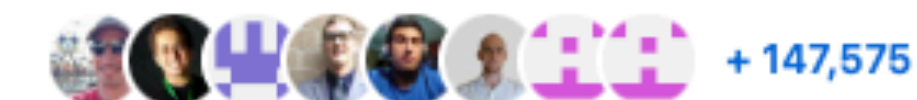
Releases

32 tags

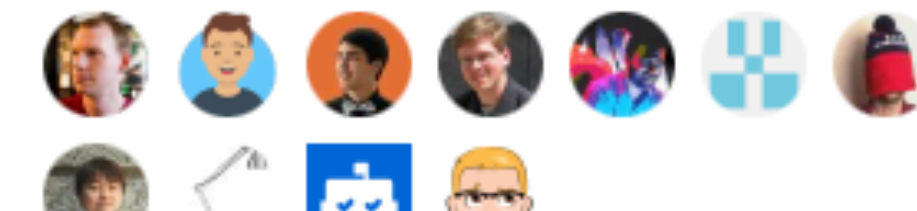
Packages

No packages published

Used by 148k



Contributors 24




```
<!DOCTYPE html>
<html lang="en">
  <head>
    ...
    <script src="idb.js"></script>
    <script src="utils.js"></script>
  </head>
  <body>
    ...
  </body>
</html>
```

```
// sw.js
```

```
importScripts("idb.js");  
importScripts("utils.js");
```

```
const DYNAMIC_CACHE = "dynamic-v1";  
const STATIC_CACHE = "static-v7";  
const STATIC_FILES = ["/", "index.html", "offline.html", "css/app.css",  
  "idb.js", "utils.js", "fonts/exo2.woff2", "js/app.js",  
  "js/a2hs.js", "js/api.js", "img/pwa.svg",  
  "favicon.png", "manifest.json", "manifest-icon-192.png"];
```

// utils.js

```
const DYNAMIC_DB = "dynamic";
const DYNAMIC_DB_VERSION = 1;
const DYNAMIC_DB_STORE = "heroes";
const API_URL = "https://www.superheroapi.com/api.php/3251184438288441/213";

// open database and get a callback after it is opened
const IDB = idb.open(DYNAMIC_DB, DYNAMIC_DB_VERSION, db => {
  // create a store if it doesn't exist already
  if (!db.objectStoreNames.contains(DYNAMIC_DB_STORE)) {
    // name the store and set the primary key
    db.createObjectStore(DYNAMIC_DB_STORE, { keyPath: "id" });
  }
});
```

```
// utils.js
```

```
function writeData(storeName, data) {  
  console.log("Write data to cache", data);  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readwrite");  
    const store = tx.objectStore(storeName);  
    store.put(data);  
    return tx.complete;  
  });  
}
```

```
// utils.js
```

```
function clearAllData(storeName) {  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readwrite");  
    const store = tx.objectStore(storeName);  
    store.clear();  
    return tx.complete;  
  });  
}
```

```
// utils.js
```

```
function readAllData(storeName) {  
  return IDB.then(db => {  
    const tx = db.transaction(storeName, "readonly");  
    const store = tx.objectStore(storeName);  
    return store.getAll();  
  });  
}
```



```
// sw.js
```

```
self.addEventListener("fetch", event => {  
  if (event.request.url.indexOf(API_URL) > -1) {  
    event.respondWith(  
      fetch(event.request).then(res => {  
        const clonedRes = res.clone();  
        clearAllData(DYNAMIC_DB_STORE)  
          .then(() => {  
            return clonedRes.json();  
          })  
          .then(data => {  
            writeData(DYNAMIC_DB_STORE, data);  
          });  
        return res;  
      })  
    );  
  }  
});
```

```
// sw.js

self.addEventListener("fetch", event => {
  if (event.request.url.indexOf(API_URL) > -1) {
    ...
  } else {
    event.respondWith(
      caches.match(event.request).then(response => {
        ...
      })
    );
  }
});
```

```
// api.js
```

```
const url = "https://www.superheroapi.com/api.php/3251184438288441/213";  
let networkDataReceived = false;
```

```
fetch(API_URL)  
  .then(res => {  
    return res.json();  
  })  
  .then(data => {  
    networkDataReceived = true;  
    console.log("Retrieved from web", data);  
    updateUI("web", data);  
  });
```

```
// api.js

readAllData(DYNAMIC_DB_STORE).then(data => {
  if (!networkDataReceived) {
    console.log("Retrieved from cache", data[0]);
    if (typeof data[0] !== "undefined") {
      updateUI("cache", data[0]);
    }
  }
});
```


PWA

PWA SuperHeroes

[about](#)

Deadpool

Wade Wilson, Canada
188 cm / 95 kg



Application

- Manifest
- Service Workers**
- Clear storage

Storage

- Local Storage
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- Cookies

Cache

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Background Services

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Service Workers

Offline Update on reload Bypass for network

https://pwa-superheroes.com/ [Update](#) [Unregister](#)

Source [sw.js](#)

Received 8-11-2019 07:41:22

Status ● #147 activated and is running [stop](#)

● #148 waiting to activate [skipWaiting](#)
Received 8-11-2019 07:45:42

Clients [https://pwa-superheroes.com/ focus](#)

Push [Push](#)

Sync [Sync](#)

▶ Service workers from other origins





New version available!


```
<div id="snackbar">A new version of this app is available.  
  Click here to update.</div>
```

```
#snackbar {  
  visibility: hidden;  
  background-color: #e02205;  
  color: #ffffff;  
  text-align: center;  
  padding: 16px;  
  position: fixed;  
  z-index: 1;  
  left: 0;  
  top: 0;  
  font-family: "Exo 2", sans-serif;  
  font-size: 20px;  
  border: 3px solid #000000;  
}
```

```
#snackbar.show {  
  visibility: visible;  
}
```

// sw.js

```
const STATIC_CACHE = "static-v8";
```

```
self.addEventListener("message", event => {  
  if (event.data.action === "skipWaiting") {  
    self.skipWaiting();  
  }  
});
```

// app.js

```
let newWorker;
```

```
function showUpdateBar() {
```

```
  let snackbar = document.getElementById("snackbar");
```

```
  snackbar.className = "show";
```

```
}
```

```
document.getElementById("snackbar").addEventListener("click", () => {
```

```
  newWorker.postMessage({ action: "skipWaiting" });
```

```
});
```

// app.js

```
navigator.serviceWorker
  .register("/sw.js")
  .then(reg => {
    reg.addEventListener("updatefound", () => {
      newWorker = reg.installing;
      newWorker.addEventListener("statechange", () => {
        switch (newWorker.state) {
          case "installed":
            if (navigator.serviceWorker.controller) {
              showUpdateBar();
            }
            break;
        }
      });
    });
  });
});
```

// app.js

```
navigator.serviceWorker.addEventListener("controllerchange", () => {  
  window.location.reload();  
});
```



PWA

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Offline Update on reload Bypass for network

https://pwa-superheroes.com/ [Update](#) [Unregister](#)

Source [sw.js](#)

Received 8-11-2019 23:33:53

Status ● #177 activated and is running [stop](#)

Clients [https://pwa-superheroes.com/](#) [focus](#)

Push [Push](#)

Sync [Sync](#)

▶ Service workers from other origins





Workbox

<https://developers.google.com/web/tools/workbox>

<https://rowdy.codes/scotland>

